

We are writing to warn of a new and serious threat to black walnut (*Juglans nigra*) that we have observed for the past several years in Colorado. We fear that this insect/disease complex may cause irreparable damage to black walnut in its native range should it be introduced. We are asking that information concerning this threat be distributed and a strategy to prevent the movement of the insect and fungus be developed.

Let us briefly describe the situation. Black walnut is not native to Colorado, but is occasionally planted as a street tree or in back yards for shade and nut production. As early as 2003 foresters in Boulder County began to notice a decline and mortality of black walnut. Trees initially showed branch dieback, but rapidly declined and died, often within one year. Mortality was initially attributed to drought, but the problem continued unabated even in years with normal precipitation and on sites not prone to drought stress. By September 2007, over 250 black walnuts had been killed. This represented a majority of the total black walnut population in that city. Walnut mortality also has been noted in Colorado Springs and other cities in the Denver Metro area.

In 2003 the walnut twig beetle (*Pityophthorus juglandis*) was observed on declining black walnut trees in Colorado Springs. This was a new report for Colorado. In 2004 the beetle was recovered from dying walnut trees in Boulder and by 2006 it was consistently found in declining trees. This beetle is native to the Southwestern United States and is apparently a minor pest of *J. major*, *J. hindsii* and *J. californica*, causing dieback of twigs and small diameter branches on stressed trees. Black walnut is not a natural host of this beetle. However, the activity of the beetle on black walnut in Colorado is much more aggressive than previously reported on native hosts. The beetles successfully attack branches in excess of 3 inches in diameter, causing major branch dieback on *J. nigra*. The behavior of these beetles is alarming.

In 2006 and 2007 we observed long vertical trunk cankers caused by the fungus *Fusarium solani* during the final stages of tree decline. This fungus is widespread in North America on *J. nigra* and typically colonizes and causes cankers following tree injury or stress (e.g. low temperature damage). *F. solani* was not isolated from beetle galleries or the walnut twig beetle and we do not believe *P. juglandis* is a vector of this pathogen.

In fall 2007 a fungus called *Geosmithia* (identification based on morphological characteristics and rDNA ITS sequence similarity of 98%) was consistently isolated from branch and twig cankers surrounding beetle galleries and directly from the beetles. *Geosmithia* spp., are associates of bark beetles of hardwood trees but have not previously been reported as a pathogen of *Juglans* or an associate of *P. juglandis*. This past month we inoculated one-year-old black walnut seedlings with two *Geosmithia* isolates in the greenhouse. The fungus aggressively colonized the bark and cankers were formed three weeks after inoculations. We are monitoring the development of these cankers and they appear to be expanding. We currently have no information on the origin of the *Geosmithia* fungus, but are collaborating with entomologists in California to determine the flora associated with *P. juglandis* in its native range and working with a researcher in the Czech Republic on fungal taxonomy.

Much more research is needed to determine the exact sequence of events that results in black walnut mortality. There may be other factors contributing to the decline that have not been identified. Nevertheless, it is clear that the walnut twig beetle has expanded its range and is much more aggressive on black walnut than its native walnut hosts. Furthermore, it is vectoring an unnamed fungus capable of causing branch cankers. We believe that this combination is triggering a tree decline that quickly results in mortality.

This problem is apparently not limited to Colorado. Widespread mortality of *Juglans* was reported in the Espanola Valley of New Mexico in 2001 and the walnut twig beetle was recovered from declining trees. Dieback and mortality of black walnut has been observed in the

Willamette Valley in Oregon for at least 5 years (J. Pscheidt, Oregon State University, personal communication) and the walnut twig beetle was recently confirmed in that location. Samples of *J. nigra* and *J. regia* (English or Persian walnut) with *P. juglandis* and *Geosmithia* have been received from Utah. Thus, the distribution of this problem appears to be widespread in the western United States.

We are not aware of any reports of black walnut decline in its native range, but certainly we should increase surveillance throughout the eastern United States and the English walnut production areas of California to insure that this pest complex has not been introduced. We are urging that immediate action be taken to ascertain the threat of this beetle/canker complex on black walnut and other *Juglans* species in their native range, as well as the potential impact on *J. regia* in California.

Ned Tisserat
Professor of Plant Pathology
Bioagricultural Sciences and Pest Management
Plant Sciences 1177
Ft. Collins CO 80523
970-491-6527
FAX 970-491-3862